

REMARKS

Claim Status

Claims 1-28 are now currently pending, with claims 1 and 13 being in independent form. Claims 1-15, 17-19 and 21-23 have been amended. The amendments to claims 15, 17, 19 and 21-23 are merely cosmetic or clarifying in nature. Support for the amendment to independent claim 1 may be found, for example, at pg. 1, line 16 and pg. 3, lines 13-16 of the specification as originally filed. Support for new dependent claims 27 and 28 may be found at pg. 1, lines 15-17 of the instant specification. No new matter has been added. Reconsideration of the application, as herein amended, is respectfully requested.

Overview of the Office Action

Claims 5-9 have been objected to based on a minor informality. Withdrawal of this objection is in order, as explained below.

Claims 9, 11 and 14 stand rejected under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Withdrawal of this rejection is also in order, as explained below.

Claims 1, 13, 14 and 19 stand rejected under 35 U.S.C §102(b) as anticipated by U.S. Patent No. 5,453,394 (“*Yonehara*”). Claims 1-14 and 16-23 stand rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,287,882 (“*Chang*”) in view of *Yonehara*. Lastly, claim 15 stands rejected under 35 U.S.C. §13(a) as unpatentable over *Yonehara* in view of U.S. Patent No. 6,740,604 (“*Kelly*”).

Applicants have carefully considered the Examiner's rejections and the comments provided in support thereof. For the following reasons, Applicants assert that all claims now presented for examination in the present application are patentable over the cited art.

Amendments Addressing Section 112 Issues and Formalities

The Examiner has indicated that the limitation "at least one of the individual layers" in line 1 of claims 5-9 lacks antecedent basis. Applicants have amended dependent claim 5 to depend from dependent claim 4. Withdrawal of the objection is therefore in order.

The Examiner has indicated that the phrase "preferably" in claim 11 and that the phrase "in particular" in claims 9 and 14 render these claims indefinite. Applicants have removed the terms "preferably" and "in particular" from claims 9, 11 and 14, and the respective features have been recited in a new dependent claim (i.e., claims 24, 25 and 26, respectively). Withdrawal of the rejections is also in order.

Descriptive Summary of the Prior Art

Yonehara discloses a method for manufacturing a silicon-on-insulator substrate (SOI-substrate), where two substrates are connected to each other by bonding. According to *Yonehara*, at least one of the two substrates can be made out of germanium (see col. 7, lines 2-6).

Chang discloses a thin-film LED having active layers that are epitaxially grown on a GaAs-substrate. These active layers are transferred from the growth substrate to a permanent carrier. *Chang* (col. 4, lines 28-30) discloses that the following materials are used as the permanent carrier, i.e., Si, GaAs, Al₂O₃, SiC, GaP, BN, AlN, glass, quartz or metal.

Kelly discloses the separation of two layers using electromagnetic radiation that is provided by a laser. *Kelly* specifically describes the use of silicon as a permanent substrate.

Summary of the Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The specification discloses an optoelectronic semiconductor body with a thin-film semiconductor body on a carrier that comprises Germanium. As described at pg. 1, line 17 to page 2, line 5 of the originally filed specification, the semiconductor thin-film body is preferably a thin-film luminescence diode chip.

Patentability of the Independent Claims under 35 U.S.C. §102(b)

The Examiner at pg. 3 of the Office Action asserts that “Yonehara shows all aspects of the instant invention”. Applicants disagree with this assertion. Independent claim 1 has been amended to recite “An optoelectronic semiconductor component having a thin-film semiconductor body arranged on a carrier of the optoelectronic semiconductor”.

Yonehara, however, describes a completely different device than the applicants’ claimed optoelectronic semiconductor component. That is, *Yonehara* is directed to a semiconductor substrate (see, e.g., col. 1, lines 9-10), but not to an optoelectronic component as now recited in independent claims 1 and 13.

In view of the foregoing, reconsideration and withdrawal of the rejection of claims 1 and 13 as anticipated by *Yonehara* under 35 U.S.C. §102 are requested.

Moreover, by virtue of the above-discussed differences between the recitations of claims 1 and 13 and the teachings of *Yonehara*, and the lack of any clear motivation for modifying *Yonehara* to achieve Applicants' claimed invention, independent claims 1 and 13 are also patentable over *Yonehara* under 35 U.S.C. §103.

Patentability of the Independent Claims under 35 U.S.C. §103(a)

The Examiner (at pg. 5 of the Office Action) acknowledged that *Chang* fails to teach or suggest "the carrier [is] made of germanium," as recited in independent claims 1 and 13, and cites *Yonehara* for this feature. Applicants disagree that the combination of *Chang* and *Yonehara* teaches the claimed invention.

Yonehara fails to teach or suggest that germanium may be used as an equivalent carrier material for an optoelectronic component. Rather, *Yonehara* teaches that germanium is an equivalent carrier material for a SOI-substrate. The subject matter encompassing optoelectronic components differs from the subject matter encompassing a SOI-substrate. Moreover, the device and method achieved by the combination of the teachings of *Yonehara* with the teachings of *Chang* does not withstand close scrutiny, because the skilled person would have no reason to combine the teachings thereof.

Yonehara (col. 1, lines 18-20) describes a SOI-substrate that comprises a monocrystalline Si-layer on an insulator. *Yonehara* (col. 1, lines 13-16) teaches that such a device is well suited for micromachining techniques, dielectric isolation techniques, SOI techniques, sensors, high power devices and communication high frequency band integrated circuit techniques. There is no teaching or suggestion whatsoever in *Yonehara* of the use of a SOI-substrate for optoelectronic devices. Moreover, the skilled person would not use a SOI-substrate for

optoelectronic component, such as a thin-film luminescence diode chip, because such as component typically has a current injection path that extends through the semiconductor body in a direction that is vertical to the semiconductor layers. Providing an insulating layer as part of the semiconductor layer sequence of the semiconductor body of *Yonehara* would interrupt this vertically flowing current injection path.

The skilled person would therefore not consider the teachings of *Yonehara* when seeking to modify the structure of *Chang* to thereby achieve the recitations of independent claim 1 or method claim 13. In particular, the skilled person would have no reason to combine the teachings of *Yonehara* with the thin-film LED disclosed in *Chang* because *Yonehara* teaches away from such a combination.

Chang (col. 4, lines 28-30) discloses a list of materials that are suitable for use as a permanent substrate. However, there is no germanium described in this list. Moreover, *Chang* expressly explains that the material for the permanent substrate must have a high level of thermal conductivity. However, the thermal conductivity of germanium, which is approximately 60 W/mK, is only in the normal range compared to other materials mentioned by *Chang*, such as silicon with a thermal conductivity of about 150W/mK or SiC having a thermal conductivity of approximately 490 W/mK. Therefore, the skilled person would not seek to use germanium as a material for the permanent carrier of a thin-film LED, since doing so would not improve the thermal conductivity of the permanent carrier (i.e., substrate) in the manner required by *Chang*.

Independent claim 1 and 13 are, accordingly, patentable over *Chang* and *Yonehara*. Reconsideration and withdrawal of the rejection of claims 1 and 13 under 35 U.S.C. §103 are requested.

Dependent Claim 15

The Examiner (at pg. 4 of the Office Action) acknowledged that *Yonehara* fails to teach or suggest “the use of laser irradiation to strip the TFS body [from] the carrier,” as recited in dependent claim 15, and cites *Kelly* for this feature. Applicants disagree that the combination of *Yonehara* and *Kelly* teaches the claimed invention.

Kelly discloses a method for separating two layers of material such that the two separated layers of material are essentially preserved (see Abstract). However, *Kelly* fails to explicitly teach or suggest an optoelectronic semiconductor. *Kelly* thus fails to teach or suggest the optoelectronic semiconductor as defined by amended independent claims 1 and 13.

The combination of *Yonehara* and *Kelly* therefore fails to teach or suggest the features recited in independent claims 1 and 13, let alone in dependent claim 15. Dependent claim 15 is, accordingly, patentable over *Yonehara* and *Kelly*. Reconsideration and withdrawal of the rejection of claim 15 under 35 U.S.C. §103 are requested.

In view of the patentability of independent claims 1 and 13, for the reasons presented above, each of dependent claims 2-12 and 15-23, as well as new dependent claims 24-28, is patentable therewith. Moreover, each of these claims includes features which serve to even more clearly distinguish the invention over the applied references.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

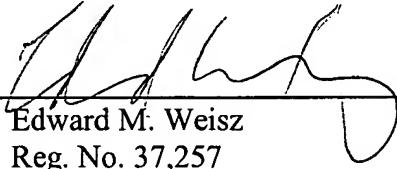
Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

A check in the amount \$250 is enclosed in payment for the addition of five new dependent claims in excess of twenty-three already paid for.

If any additional fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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